

Fact Sheet for State Waste Discharge Permit ST0008024

Moses Lake Larson Wastewater Treatment Plant

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed State Waste Discharge permit for Moses Lake Larson Wastewater Treatment Plant (Larson WWTP) that will allow discharge of wastewater to infiltration lagoons at 6691 Randolph Road, Moses Lake, Washington.

State law requires any domestic wastewater facility to obtain a permit before discharging waste or chemicals to waters of the state, which includes groundwater.

Whenever there is a change in the characteristics of the discharge or the treatment system, or if significant changes were made during the previous five-year permit cycle, Ecology makes the draft permit and fact sheet available for public review and comment at least 30 days before issuing the final permit. Since Ecology issued the current permit, Larson WWTP has made no changes in the treatment system, and the quality/quantity of the wastewater has not changed. Therefore, Ecology is not required to public notice the draft permit to invite review and comment. For more details, please see **Appendix A - Public Involvement Information**.

This fact sheet complies with Section 173-220-090(5) of the Washington Administrative Code (WAC), which states that public notification requirements do not apply for permit renewal if there are no increases in volume or changes in the characteristics of discharge beyond those previously authorized.

Larson WWTP reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, wastewater discharges, or receiving water prior to publishing this draft fact sheet for public notice.

Summary

The Larson Wastewater Treatment Plant, located southeast of the Grant County Airport, is the smaller of two Municipal Wastewater Treatment Plants operated by the City of Moses Lake. The site was developed as the Larson Army Air Corp Base in 1943, subsequently acquired by the Port of Moses Lake. The Port converted the Air Field to the Grant County Airport.

The 34-acre wastewater treatment system was sold to the City of Moses Lake in 1967 and converted to a municipal wastewater treatment facility in the early 1970s. In 2002, Moses Lake upgraded the treatment process, installing an extended aeration/activated sludge (Biolac System) plant. It is permitted to receive an average of 750,000 gallons per day of municipal wastewater, including wastewater discharged from 37 industrial or commercial facilities in Moses Lake.

Treated effluent infiltrates to groundwater. Biosolids are land applied to agricultural fields owned by the City of Moses Lake. Three groundwater monitoring wells monitor the aquifer underlying the treatment plant to evaluate facility compliance with groundwater quality standards. Moses Lake has operated the Larson WWTP in perfect compliance with the permit conditions for ten years.

Both Moses Lake wastewater treatment plants (Larson and Sand Dunes) were granted an exemption from the Total Dissolved Solids (TDS) groundwater quality standard of 500 mg/L in 1987. The exemption was based on a determination of overriding of public interest (OCPI) for the construction and operation of US KDK Corporation facility (since then acquired and operated by Chemi Con Materials Corporation) and the Advanced Silicon Materials Inc. (under a joint venture, the facility is operated by REC Silicon). Both industries discharge high TDS concentration effluent. Neither industry discharges wastewater to Larson WWTP at this time. Discharge from REC Silicon is routed to the Moses Lake Sand Dunes WWTP. Chemi Con has since diverted their wastewater from Larson WWTP to the Port of Moses Lake. The groundwater quality limit downgradient of the Larson WWTP infiltration basins was set at 1,000 mg/L for TDS, and remained at the level in the previously issued permit. This permit reduces the limit to 600 mg/L for TDS in preparation to meet the groundwater standard of 500 mg/L by permit expiration in five years.

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I. Introduction

The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in the Water Pollution Control law, chapter 90.48 RCW (Revised Code of Washington).

Ecology adopted rules describing how it exercises its authority:

- State waste discharge program (chapter 173-216 WAC)
- Water quality standards for ground waters of the state of Washington (chapter 173-200 WAC)
- Discharge standards and effluent limits for domestic wastewater facilities (chapter 173-221 WAC)
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC)

These rules require any domestic wastewater facility to obtain a State Waste Discharge permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the State Waste Discharge permit program and in response to a complete and accepted permit application, Ecology generally prepares a draft permit and accompanying fact sheet, and makes it available for public review before final issuance. If the volume of the discharge has not changed or if the characteristics of the discharge have not changed Ecology may choose not to issue a public notice. When Ecology publishes an announcement (public notice); it tells people where they can read the draft permit, and where to send their comments, during a period of thirty days. (See **Appendix A - Public Involvement Information** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft State Waste Discharge permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in **Appendix E**.

II. Background Information

Table 1: General Facility Information

Facility Information	
Applicant	City of Moses Lake 401 S. Balsam St., Moses Lake, WA 98837
Facility Name and Address	Larson Wastewater Treatment Plant 6691 Randolph Road, Moses Lake, WA 98837
Contact at Facility	Chris Campbell, Wastewater Manager (509) 793-0190

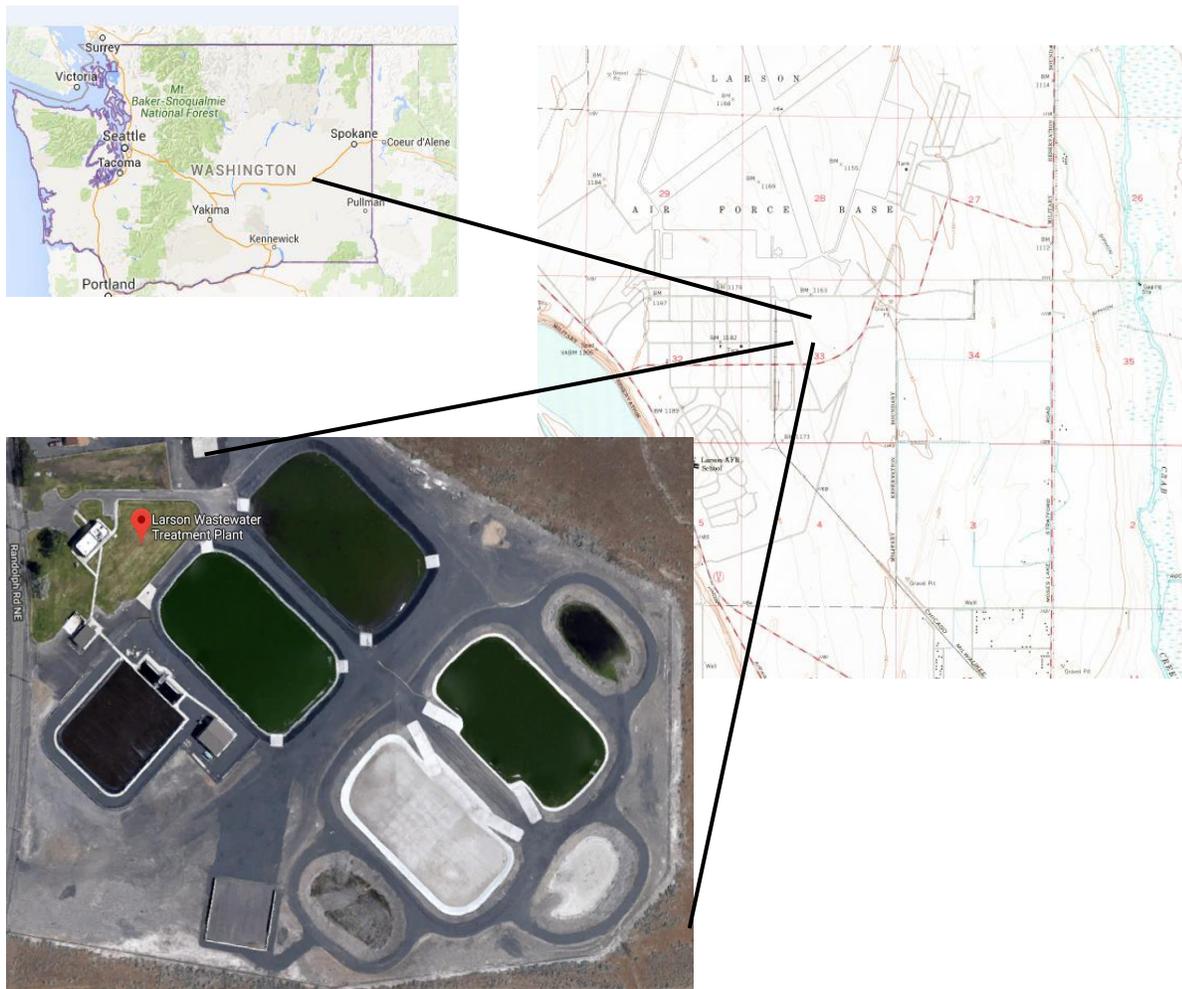
Facility Information	
Responsible Official	David Curnel, Mayor (509) 764-3703
Type of Treatment	Extended air activated sludge (Biolac) with ultraviolet light disinfection
SIC Codes	4952
NAIC Codes	221320
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.188118 Longitude: -119.293887
Legal Description of Application Area	T20N., R28E, Section 34 Latitude: 47° 11' 14" N Longitude: -119° 17' 27" W

Groundwater Monitoring Well Information	
MW-4 (upgradient)	Ecology tag # ABT554 Lat: 47.189 (NAD83) Long: -119.289 Elevation: 1143.80 feet
MW-3	Ecology tag # BCE786 Lat: 47.18639 (NAD83) Long: -119.293 Elevation: 1144.07 feet
MW-2	Ecology tag # BCE785 Lat: 47.18662 (NAD83) Long: -119.289 Elevation: 1142.46 feet

Permit Status	
Renewal Date of Previous Permit	August 1. 2011
Application for Permit Renewal Submittal Date	February 19. 2016

Permit Status	
Date of Ecology Acceptance of Application	February 23, 2016
Inspection Status	
Date of Last Non-sampling Inspection	August 10, 2016

Figure 1: Facility Location Map



A. Facility description

History

The Larson WWTP, located southeast of the Grant County Airport, is the smaller of two Municipal Wastewater Treatment Plants operated by the City of Moses Lake. The site was developed as the Larson Army Air Corp Base in 1943, subsequently acquired by the Port of Moses Lake. The Port converted the air field to the Grant County Airport and sold the 34-acre wastewater treatment system to the City of Moses Lake in 1967. In the early 1970s, Moses Lake converted it to a municipal wastewater treatment facility. In 2002 Moses Lake upgraded the treatment process, installing an extended aeration/activated sludge (Biolac System) plant. It is currently permitted to receive an average of 750,000 gallons per day of municipal wastewater, including wastewater discharged from 37 industrial or commercial facilities.

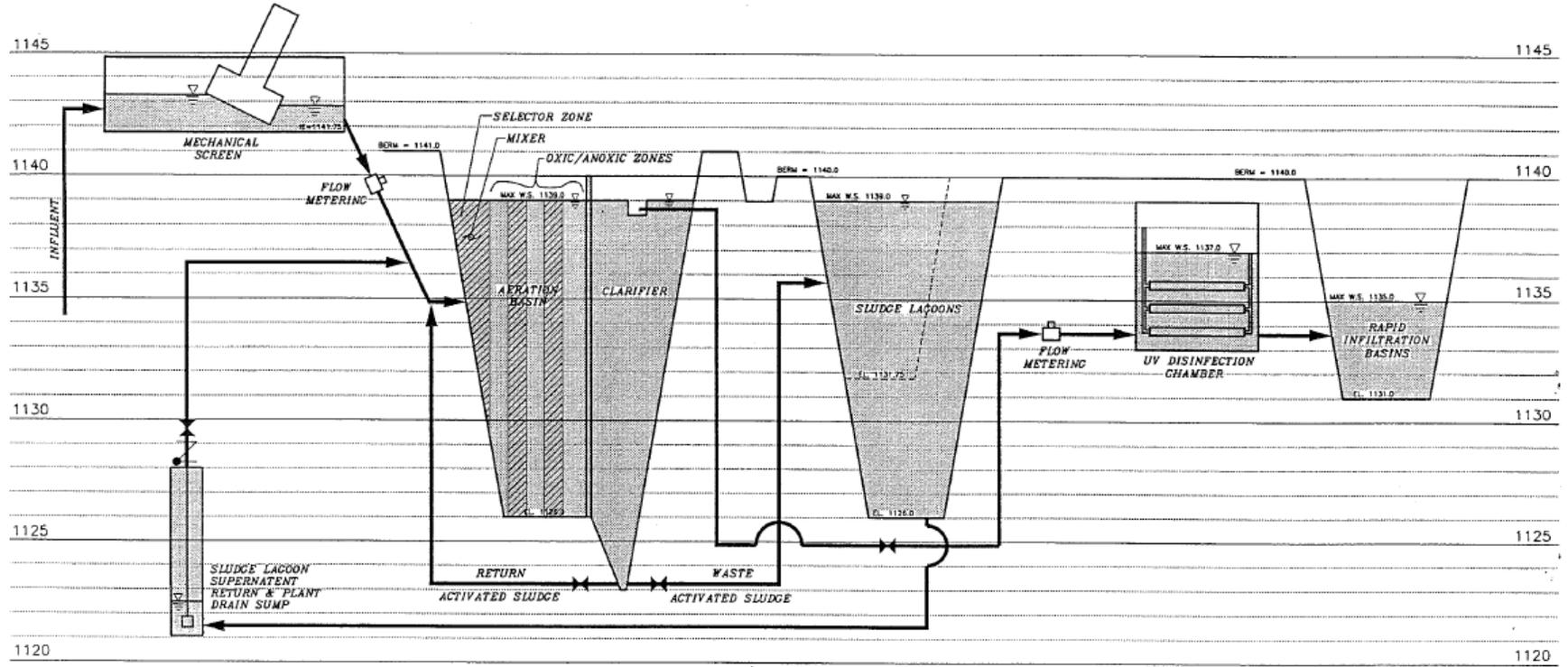
Collection system status

The Larson WWTP treats sewage transported through a collection system that conveys wastewater through six lift stations and 20.2 miles of collection system pipelines, serving about 12 square miles of northeastern Moses Lake. Lift stations connect to the gravity trunk line that conveys an average of 38,000 gallons daily directly to the Larson WWTP.

The initial collection system was constructed as part of the wastewater treatment facility operated by Larson Air Corps base in the 1940s. In 1971, after acquiring the site, Moses Lake produced a Facility Plan that included upgrades to the existing wastewater treatment system and expansion of the collection system to incorporate wastewater generated by industries and residences in the vicinity. Ongoing upgrades to the collection system continue, and are currently completed according to the schedule established in the 2015 Moses Lake Wastewater System Master Plan.

The dry climate and highly permeable sandy soils create conditions in the Moses Lake region that are unlikely to generate infiltration and inflow (I/I) issues within the Larson WWTP collection system. The extensive Moses Lake collection system (over 136 miles of collection lines throughout 15.6 square miles of the incorporated area) leads to hydrogen sulfide buildup in the lines, causing corrosion and breaches which periodically result in sewage spills. Recent sewage spills have occurred in the Sand Dunes WWTP collection lines, Moses Lake's other, larger, wastewater treatment system, but the Larson WWTP collection lines have not experienced any sewage spills.

Figure 2: Schematic Diagram of Flow Treatment Process



WATER SURFACE	SCREENING	AERATION BASIN	CLARIFIER	UV	RI BASIN
WATER SURFACE					
PEAK (1.2 MGD)	1143.5	1139.2	1139.2	1137.3	1133.0
DESIGN (0.75 MGD)	1143.0	1139.0	1139.0	1137.0	1132.0
LENGTH (FT)	20	137	80	N/A	N/A
WIDTH (FT)	3.5	85	25	N/A	N/A
SWD (FT)	2	13	13	N/A	N/A
VOL (GAL)	N/A	976,000	175,000	N/A	N/A
HYDRAULIC DETENTION (DAYS)	N/A	1.30	0.23	N/A	N/A
AERATION	N/A	DIFFUSED	N/A	N/A	N/A
TYPE	N/A	COMPLETE MIX	N/A	N/A	N/A

Wastewater treatment process

In 2002 Moses Lake upgraded the Larson WWTP to a Biolac Treatment system designed by Wilson Engineering, as documented in the “City of Moses Lake Facility Plan Addendum for Wastewater Treatment Facility Improvements” (2000).

The upgraded facility consists of:

- Headworks (includes a grit chamber, mechanical screens and composite sampler)
- One aeration basin
- Two clarifiers
- Two HDPE-lined sludge wasting basins
- Two concrete-lined sludge drying basins
- Three rapid infiltration basins
- One concrete pad for biosolids storage
- Warehouse with ultraviolet disinfection system, control room, workshop, and blower room
- Office building with laboratory

The Biolac treatment system includes an integral clarifier for sludge separation and recycling. A schematic diagram of the wastewater treatment process is shown in Figure 2. Solids separated out from the treatment process are dried and stored until land applied on property owned by Moses Lake near the Sand Dunes WWTP. Treated water is discharged to the rapid infiltration basins and infiltrated to groundwater. This is a Level 3 wastewater treatment facility, staffed by a team of Level 1, 2, and 3 certified operators who operate and maintain both the Larson and the Sand Dunes Wastewater Treatment Plants.

Moses Lake conducted a survey of the industrial users that discharge to the Larson WWTP in 2014. The survey documented discharges from the following categories of industries:

- 6 Significant Industrial users
- 5 Minor Industrial users
- 26 domestic equivalent commercial users

Infiltration basins

Treated effluent is discharged to three rapid infiltration basins, each 0.5 acres in area, with a six-foot depth storage capacity. The sandy sediments underlying the infiltration basins are highly permeable; Shannon and Wilson (2000) estimated the infiltration rate through the underlying sediments at 20 inches/hour (40 feet/day).

The three infiltration basins (total area 65,000 square feet) have the capacity to infiltrate the entire daily treatment design capacity (750,000 gallons).

Solid wastes/residual solids

Larson WWTP removes solids during the treatment of the wastewater at the headworks (grit and screenings), in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Moses Lake Larson drains grit, rags, scum, and screenings and disposes this solid waste at the Moses Lake landfill. Solids removed from the clarifier are treated in the two sludge lagoons, where they are digested and stabilized. Liquid from the sludge lagoon is returned to the aeration basin for additional treatment. Stabilized biosolids are stored and dried in two concrete-lined sludge drying basins. Once the drying basins are filled, the biosolids are tested according to the requirements of the Ecology-issued Biosolids General Permit No. BT8035. If test results are compliant with permit criteria, sludge is transported to the Moses Lake Sand Dunes wastewater treatment plant and applied to city-owned property as an agricultural amendment under a permit from the Grant County Health District. This facility has met the solid waste requirements for screening, as required by WAC 173-308-205, confirmed by Betty Ann Bickner, the Biosolids Coordinator for Ecology's Eastern Region.

B. Description of the groundwater

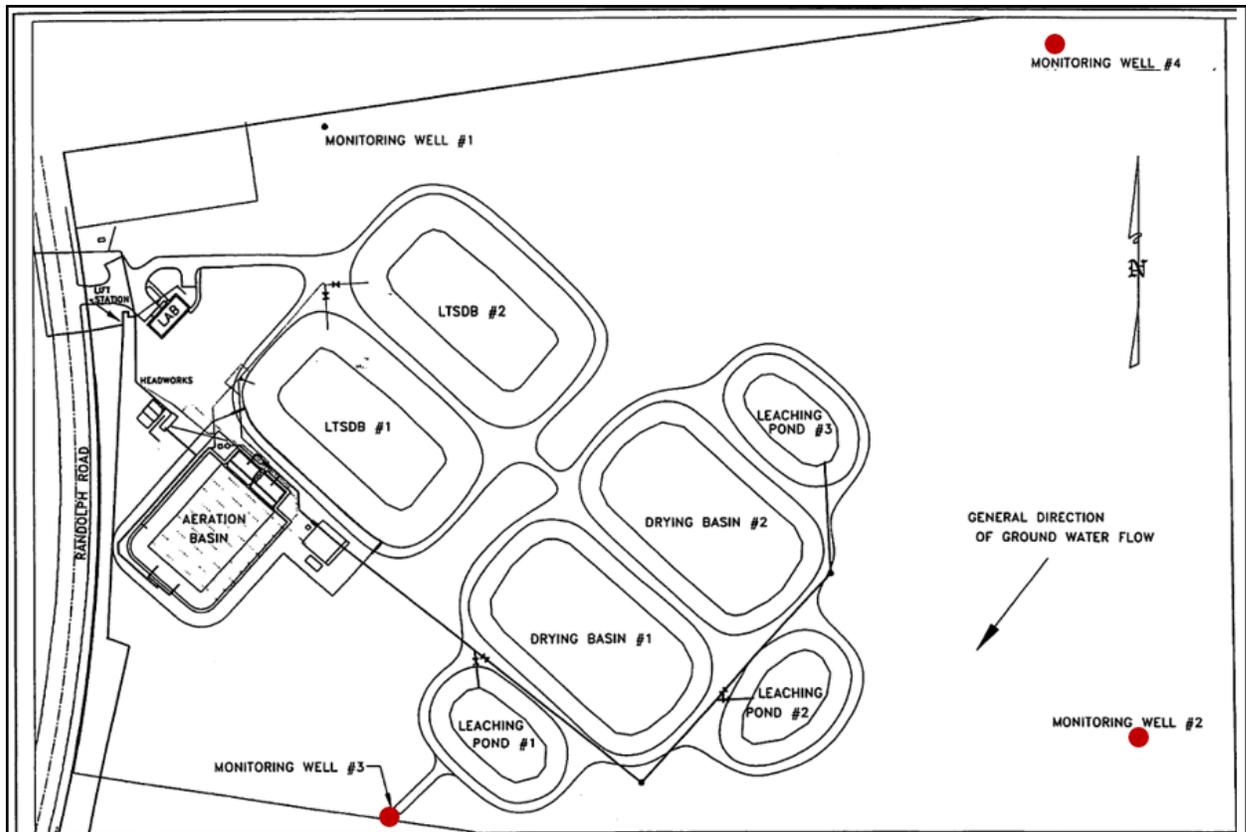
Treated effluent from the Moses Lake Larson WWTP infiltrates to groundwater beneath the site. The facility is underlain by high permeability glacial flood deposits that extend to depths of 80 to 100 feet below the ground surface. Coarse-grained Hanford Formation glacial sediments overlay Ringold Formation that together form the unconfined aquifer, which has accumulated on extensive, low-permeability Columbia Basin basalts.

Groundwater accumulates on the upper basalt surface and forms a shallow, unconfined aquifer that ranges in depth from 60 to 80 feet below the ground surface. The upper basalt surface slopes gradually westward. The groundwater gradient dips from northeast to southwest, transporting groundwater southward, to discharge into Moses Lake two miles to the southwest. Groundwater beneath the facility is monitored in one upgradient and two downgradient wells; monitoring well locations are shown in Figure 3.

Permit writers in some cases must decide if the discharge of a pollutant onto the ground near a surface water is subject to an NPDES permit or State Waste discharge permit. Ecology believes the best guidance on this issue comes from the United States District Court Eastern District of Washington (*Washington Wilderness Coalition v. Hecla Mining*, 870 F. Supp 983, 990).

The court held that since the goal of the Clean Water Act (CWA) is to protect the quality of surface waters, any pollutant, which enters such waters, whether directly or through groundwater, is subject to regulation by NPDES permit. The court went on to hold, "It is not sufficient to allege groundwater pollution, and then to assert a general hydrological connection between all waters. Rather, pollutants must be traced from their source to surface waters, in order to come within the purview of the CWA."

Figure 3: Diagram of Monitoring Well Locations



Ecology has determined that it should issue a State Waste Discharge Permit and not an NPDES permit for this site because the nitrate and total dissolved solids concentrations monitored in the downgradient wells (MW-2 and MW-3) are typically lower than the concentrations detected in the upgradient well (MW-4), indicating that the treated wastewater effluent is improving groundwater quality. In addition, the infiltration lagoons are located two miles north (upgradient) and one mile east of the nearest surface water body (Moses Lake). This distance is sufficient to dilute the concentrations of any wastewater constituents infiltrated that might affect surface water quality.

C. Wastewater influent characterization

Moses Lake Larson reported the concentration of influent constituents in discharge monitoring reports. In addition to the parameters listed in Table 2, Moses Lake monitors influent flow and pH daily; influent flow averaged 314,000 gallons/day from 2015 to 2019. The influent wastewater is characterized as follows:

Table 2: Wastewater Influent Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	mg/L	247	277	377
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	lbs/day	247	613	1,078
Total Suspended Solids (TSS)	mg/L	247	274	607
Total Suspended Solids (TSS)	lbs/day	247	739	1,736
Total Kjeldahl Nitrogen (TKN)	mg/L	247	52.9	70.3
Total Kjeldahl Nitrogen (TKN)	lbs/day	247	143	195
Ammonia	mg/L	247	36.8	55
Ammonia	lbs/day	247	100	152
Fixed Dissolved Solids (FDS)	mg/L	247	317	504

D. Wastewater effluent characterization

Moses Lake Larson WWTP reported the concentration of constituents in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the effluent discharged from 2012 - 2020. Moses Lake Larson also monitors effluent for the following constituents that were not detected in any of the effluent samples collected: chromium, lead, mercury, silver, and zinc. The effluent prior to infiltration is characterized as follows:

Table 3: Wastewater Effluent Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	mg/L	247	2.5	11
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	lbs/day	247	6.8	30
Total Suspended Solids (TSS)	mg/L	247	2.7	12
Total Suspended Solids (TSS)	lbs/day	247	7.3	34
Ammonia	mg/L	248	0.197	2.28
Ammonia	lbs/day	248	0.61	19
Total Kjeldahl Nitrogen	mg/L	247	1.3	3.4
Total Kjeldahl Nitrogen	lbs/day	247	3.5	9.3
Arsenic	µg/L	17	2.0	3.0
Cadmium	µg/L	17	3.9	0.58
Calcium	mg/L	7	27.8	40.5
Copper	µg/L	7	3.21	4.7
Iron	µg/L	7	0.11	0.31
Manganese	mg/L	7	11	14.2
Nitrate	mg/L	247	1.4	11.1
Fixed Dissolved Solids (FDS)	mg/L	247	319	528
Potassium	mg/L	7	23.4	26
Sodium	mg/L	7	87.7	110
Zinc	µg/L	7	65.6	89

Parameter	Units	# of Samples	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	#/100 mL	56	29.6	54

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	standard units	56	6.22	8.12

E. Summary of compliance with previous permit issued

The previous permit placed effluent limits on: pH, carbonaceous biologic oxygen demand, total suspended solids, fecal coliform, total nitrogen, nitrate, and total dissolved solids.

Moses Lake has complied with the effluent limits and permit conditions throughout the duration of the permit issued on July 20, 2011. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections conducted by Ecology. In addition, Moses Lake's automatic pH monitoring system malfunctioned in January of 2018 causing them to miss the required reporting for pH for five days in that month. Moses Lake received the perfect facility compliance award for the Larson WWTP every year from 2008 through 2018.

The following table summarizes violations over the permit term.

Table 4: Violations

Month	Monitoring Point	Monitoring Parameter	Unit	Statistical Base	Value Entered	Limit	Violation Type
January 2018	IN1	pH	standard unit	Daily Max sample 1/4/2018	No value entered	-	O code entered
January 2018	IN1	pH	standard unit	Daily Min sample 1/10/2018	No value entered	-	O code entered
January 2018	IN1	pH	standard unit	Daily Max sample 1/11/2018	No value entered	-	O code entered

Month	Monitoring Point	Monitoring Parameter	Unit	Statistical Base	Value Entered	Limit	Violation Type
January 2018	IN1	pH	standard unit	Daily Min sample 1/11/2018	No value entered	-	O code entered
January 2018	IN1	pH	standard unit	Daily Min sample 1/12/2018	No value entered	-	O code entered
January 2018	IN1	pH	standard unit	Daily Max sample 1/12/2018	No value entered	-	O code entered
January 2018	IN1	pH	standard unit	Daily Min sample 1/13/2018	No value entered	-	O code entered
January 2018	IN1	pH	standard unit	Daily Max sample 1/13/2018	No value entered	-	O code entered
January 2018	IN1	pH	standard unit	Daily Min sample 1/14/2018	No value entered	-	O code entered
January 2018	IN1	pH	standard unit	Daily Max sample 1/14/2018	No value entered	-	O code entered
January 2018	001	pH	standard unit	Minimum	6.22	6.5	Permit limit exceedence
April 2017	001	Fecal Coliform	#100/mL	Maximum	54	50	Permit limit exceedence

Table Notes:

O code – Other Violation code. This code generates a violation when entered on the DMR.

The following table summarizes compliance with report submittal requirements over the permit term.

Table 5: Permit Submittals

Submittal Name	Submittal Status	Due Date	Received Date
2011 Wasteload Assessment	Received	3/1/2012	1/31/2012
2012 Wasteload Assessment	Received	3/1/2013	2/4/2013
2013 Wasteload Assessment	Received	3/1/2014	2/5/2014

Submittal Name	Submittal Status	Due Date	Received Date
2014 Wasteload Assessment	Submitted	3/1/2015	2/27/2015
2015 Wasteload Assessment	Received	3/1/2016	2/12/2016
2016 Wasteload Assessment	Submitted	3/1/2017	1/31/2017
2017 Wasteload Assessment	Submitted	3/1/2018	2/13/2018
2018 Wasteload Assessment	Submitted	3/1/2019	2/14/2019
2019 Wasteload Assessment	Submitted	3/1/2020	2/28/2020
Application for Permit Renewal	Received	3/1/2016	2/19/2016
O & M - Operation and Maintenance Manual (update)	Received	---	1/31/2012
O & M - Operation and Maintenance Manual (update)	Received	---	2/4/2013
O & M - Operation and Maintenance Manual (update)	Received	---	2/5/2014

F. State environmental policy act (SEPA) compliance

State law exempts the issuance, reissuance, or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

III. Proposed Permit Limits

State regulations require that Ecology base limits in a State Waste Discharge permit on the:

- Technology and treatment methods available to treat specific pollutants (technology-based). Dischargers must treat wastewater using all known, available, reasonable methods of prevention, control, and treatment (AKART). Ecology and the state Department of Health have adopted technology-based (AKART) criteria for municipal systems that discharge to ground; (WA. Dept. of Health, 1994).
- Operations and best management practices necessary to meet applicable water quality standards to preserve or protect beneficial uses for groundwaters.
- Ground water quality standards (Ecology, 1996).
- Applicable requirements of other local, state and federal laws.

Ecology applies the most stringent of technology and water quality-based limits to each parameter of concern and further describes the proposed limits below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, monitoring, and irrigation/crop management).

Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, and are not listed in regulation.

Ecology does not usually develop permit limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize the discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent. Until Ecology modifies the permit to reflect additional discharges of pollutants, a permitted facility could be violating its permit.

A. Design criteria

Under WAC 173-216-110 (4), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for this facility's treatment plant in the facility plan dated January 2000 and prepared by Wilson Engineering. The table below includes design criteria from the referenced report.

Table 6: Design Criteria for the Wastewater Treatment Facility

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	0.92 MGD
Monthly Average Daily Flow	0.75 MGD
Peak Instantaneous Design Flow (PIDF)	1.2 MGD
BOD ₅ Loading for Maximum Month	1,877 lbs/day
TSS Loading for Maximum Month	1,877 lbs/day
Total Kjeldahl Nitrogen (TKN)	219 lbs/day
Ammonia (NH ₃)	188 lbs/day

B. Technology-based effluent limits

Waste discharge permits issued by Ecology specify conditions requiring the facility to use all known available and reasonable methods of prevention, control, and treatment of discharges AKART before discharging to waters of the state (RCW 90.48).

Ecology defines AKART for domestic wastewater facilities in chapter 173-221 WAC, Discharge Standards and Effluent Limits for Domestic Wastewater Facilities and in the Department of Health’s design criteria (1994).

Ecology approved the engineering report titled City of Moses Lake Facility Plan Addendum for Wastewater Treatment Facility Improvements, dated January 2000, and prepared by Wilson Engineering (Facility Plan Addendum).

Ecology evaluated the report for technology-based requirements using the:

- Discharge standards and effluent limits for domestic wastewater facilities
- Criteria for Sewage Works Design, Ecology, 2008

Wastewater Treatment Requirements

Ecology determined that the facility meets the minimum requirements demonstrating compliance with the AKART standard if the Larson WWTP operates the treatment and disposal system as described in the approved engineering report and any subsequent Ecology approved reports. The facility design criteria approved in the Facility Plan Amendment is derived for the extended aeration treatment system constructed at the Larson WWTP in 2002, presented in the table above. The criteria proposed for this permit differ slightly from the limits established in the previous permit, as follows. The facility was designed to treat and reduce Biochemical Oxygen Demand (BOD), not Carbonaceous Biochemical Demand (CBOD). The BOD design criteria from the approved Engineering Report is restored in defining the permit limits. Ecology does not regulate Total Suspended Solids (TSS) in groundwater, so a limit on TSS content in effluent is not applicable to the protection of groundwater quality. Further, infiltration through the 60-foot depth of unsaturated sediments beneath the Larson WWTP infiltration lagoons filters out any suspended solids in the effluent prior to encountering groundwater. For that reason limits on and monitoring of TSS content in wastewater influent and effluent are not used to regulate facility compliance in the proposed permit.

Ecology also evaluated the Engineering report for groundwater quality-based requirements which are described in the next section of the fact sheet.

Table 7: Technology-based Limits

Parameter	Average Monthly Limit	Average Weekly Limit
BOD ₅ (concentration) ^a	10 mg/L	15 mg/L
Total Kjeldahl Nitrogen (TKN)	2 mg/L	3 mg/L

Parameter	Average Monthly Limit	Average Weekly Limit
Ammonia	1 mg/L	1.5 mg/L

^a BOD₅ (concentration) – The BOD₅ effluent concentration must not exceed 35% of the average influent concentration.

Parameter	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit
Fecal Coliform Bacteria	200 organisms/100 mL	400 organisms/100 mL

Parameter	Daily Minimum	Daily Maximum
pH	6.0 standard units	9.0 standard units

Technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for BOD₅ and Total Suspended Solids as follows:

$$\text{Max Limit} = \text{CL} \times \text{DF} \times \text{CF}$$

Where:

CL = Technology-based concentration limits listed in the above table

DF = Maximum Monthly Average Design Flow (MGD)

CF = Conversion factor of 8.34

Table 8: Technology-based Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD ₅ Monthly Average	10	63
BOD ₅ Weekly Average	15	94
Total Kjeldahl Nitrogen (TKN)	2	13
Ammonia (NH ₃)	1	6

C. Groundwater quality based effluent limits

In order to protect existing water quality and preserve the designated beneficial uses of Washington's groundwaters including the protection of human health, WAC 173-200-100 requires Ecology to condition discharge permits in such a manner as to authorize only activities that will not cause violations of the groundwater quality standards. The goal of the groundwater quality standards is to maintain the highest quality of the State's groundwaters and to protect existing and future beneficial uses of the groundwater through the reduction or elimination of the discharge of contaminants to groundwater [WAC 173-200-010(4)].

Ecology achieves this goal by:

- Applying all known available and reasonable methods of prevention, control and treatment (AKART) to any discharge.
- Applying the antidegradation policy of the groundwater standards.
- Establishing numeric and narrative criteria for the protection of human health and the environment in the groundwater quality standards.

Ecology approved the engineering report as noted above in the technology based limits section.

In addition, Ecology evaluated the report to ensure compliance with groundwater standards using the:

- Ecology [Publication #04-10-081](https://fortress.wa.gov/ecy/publications/documents/0410081.pdf), **Guidance on Land Treatment of Nutrients in Wastewater, with Emphasis on Nitrogen**, Ecology, November 2004 is located online at <https://fortress.wa.gov/ecy/publications/documents/0410081.pdf>.

Antidegradation Policy

The State of Washington's ground water quality standards (GWQS) require preservation of existing and future beneficial uses of groundwater through the antidegradation policy, which includes the two concepts of antidegradation and non-degradation.

Antidegradation

Antidegradation is not the same as non-degradation (see below). Antidegradation applies to calculation of permit limits in groundwater when background (see below) contaminant concentrations are less than criteria in the GWQS. Ecology has discretion to allow the concentrations of contaminants at the point of compliance to exceed background concentrations but not exceed criteria in the GWQS. Ecology grants discretion through an approved AKART engineering analysis of treatment alternatives. If the preferred treatment alternative predicts that discharges to groundwater will result in contaminant concentrations that fall between background concentrations and the criteria, then the preferred treatment alternative should protect beneficial uses and meet the antidegradation policy. In this case, the predicted concentrations become the permit limits.

If the preferred alternative will meet background contaminant concentrations, background concentrations become the permit limits. Permit limits must protect groundwater quality by preventing degradation beyond the GWQS criteria. If discharges will result in exceedance of the criteria, facilities must apply additional treatment before Ecology can permit the discharge.

Non-degradation

Non-degradation applies to permit limits in groundwater when background contaminant concentrations exceed criteria in the GWQS. Non-degradation means that discharges to groundwater must not further degrade existing water quality.

In this case, Ecology considers the background concentrations as the water quality criteria and imposes the criteria as permit limits.

More information on antidegradation and non-degradation is available by referring to Ecology [Publication #96-02](https://fortress.wa.gov/ecy/publications/SummaryPages/9602.html), the **Implementation Guidance for the Ground Water Quality Standards** (Implementation Guidance), located online at <https://fortress.wa.gov/ecy/publications/SummaryPages/9602.html>.

Background Water Quality

Background water quality is determined by a statistical calculation of contaminant concentrations without the impacts of the proposed activity. The calculation requires an adequate amount of groundwater quality data and determining the mean and standard deviation of the data, as described in the Implementation Guidance. Following the procedure in the Implementation Guidance, Ecology then defines background water quality for most contaminants as the 95 percent upper tolerance limit. This means that Ecology is 95 percent confident that 95 percent of future measurements will be less than the upper tolerance limit. There are a few exceptions to the use of the upper tolerance limit. For pH, Ecology will calculate both an upper and a lower tolerance limit resulting in an upper and lower bound to the background water quality. Background groundwater quality is calculated using data collected from the upgradient well, MW-4.

Applicable groundwater criteria as defined in Chapter 173-200 WAC and in RCW 90.48.520 for this discharge include those in the following table:

Table 9: Groundwater Quality Criteria

Parameter	Units	Groundwater Criteria	Background Value
Total Coliform	colonies/100 mL	1	NA
Total Dissolved Solids	mg/L	500	420
Nitrate (as nitrogen)	mg/L	10	6

Parameter	Units	Groundwater Criteria	Background Value
pH (Minimum/Maximum)	standard units	6.5 to 8.5	NA
Total Iron	mg/L	0.3	0.2

Ecology has reviewed existing records for the facility's infiltration site and determined sufficient data exists to update the background groundwater quality as defined in chapter 173-200 WAC and described in the Implementation Guidance for the Ground Water Quality Standards; Ecology, Revised October 2005. **Appendix D** includes Ecology's calculations to update the background groundwater quality.

D. Comparison of effluent limits with the previous permit issued on July 20, 2011

Modifications to the effluent limits in the proposed permit restore the design criteria presented in the approved Engineering Report and align the limits with the groundwater quality criteria. The proposed permit removes the effluent flow limit because the approved Engineering Report is based on an average maximum influent loading rate of 750,000 gallons/day; it does not establish an average effluent discharge rate. The Engineering report established a treatment capacity for Biochemical Oxygen Demand (BOD), not Carbonaceous Biochemical Oxygen Demand (CBOD) which the current permit regulates. The proposed permit restores the engineering design parameter of BOD as the regulated parameter.

Ecology does not regulate fecal coliform content in groundwater. Instead the Groundwater Quality Criteria established in Chapter 173-200 WAC regulates total coliform content (1 colony forming unit/100 mL) in groundwater. To maintain consistency between the groundwater quality criteria and the effluent criteria for bacteria content the proposed permit is modified to require total coliform monitoring in effluent instead of fecal coliform monitoring.

Similarly, the Groundwater Quality Criteria establishes a limit for nitrate in groundwater, but does not set a limit for total nitrogen content in groundwater. The permit includes an effluent nitrate concentration limit calculated from the Engineering Report of 6 mg/L, less than the groundwater quality standard. Previously reported groundwater nitrate concentrations have consistently met the previous permit's limit on total nitrogen content. Including monitoring of total nitrogen concentration in effluent is redundant and unnecessary, and is removed from the proposed permit.

Ecology does not regulate TSS in groundwater, so a limit on suspended solids content in effluent is not applicable to the protection of groundwater quality. Further, infiltration through the 60 feet depth of unsaturated sediments beneath the Larson WWTP infiltration lagoons filters out any suspended solids in the effluent prior to encountering groundwater.

For that reason limits on and monitoring of total suspended solids content in wastewater influent and effluent are not used to regulate facility compliance in the proposed permit.

The groundwater quality criteria regulates Total Dissolved Solids (TDS) content in groundwater, not Fixed Dissolved Solids (FDS), which is the parameter that was used to regulate dissolved solids content in the previous permit. The proposed permit restores TDS as the criteria for evaluating facility compliance with groundwater quality standards. Further, the previous permit defined a TDS concentration in effluent of 1,000 mg/L to evaluate facility compliance, derived from an overriding public interest determination made in 1989. The proposed permit establishes 600 mg/L TDS as the effluent limit, to move the facility toward compliance with Chapter 173-200 criteria of 500 mg/L in subsequently issued permits.

Table 10: Comparison of Previous and Proposed Limits

		Previous Effluent Limits: Outfall 001	Previous Effluent Limits: Outfall 001	Proposed Effluent Limits: Outfall 001	Proposed Effluent Limits: Outfall 001
Parameter	Basis of Limit	Average Monthly	Average Weekly	Average Monthly	Average Weekly
Biochemical Oxygen Demand (5-day)	Technology	NA	NA	10 mg/L	15 mg/L
Carbonaceous Biologic Oxygen Demand (5-day)	Technology	10 mg/L	15 mg/L	NA	NA
Flow	Technology	750,000 gallons/day	NA	NA	NA
Total Suspended Solids	Technology	15 mg/L	23 mg/L	NA	NA

Parameter	Basis of Limit	Maximum Daily Limit	Weekly Geometric Mean Limit	Maximum Daily Limit	Monthly Geometric Mean Limit
Fecal Coliform Bacteria	Technology	50 CFU/100 mL	NA	NA	NA
Total Coliform Bacteria	Groundwater Quality	NA	NA	NA	50 CFU/100 mL

Parameter	Basis of Limit	Daily Minimum	Daily Maximum
pH	Groundwater Quality	6.5 standard units	8.5 standard units

Parameter	Basis of Limit	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Total Dissolved Solids	Groundwater Quality	NA	1,000 mg/L	NA	600 mg/L
Nitrate + Nitrite Nitrogen	Technology	NA	6 mg/L	NA	6 mg/L
Total Nitrogen	Technology	NA	8 mg/L	NA	NA

IV. Monitoring Requirements

Ecology requires monitoring, recording, and reporting (WAC 173-216-110) to verify that the treatment process functions correctly, the discharge meets groundwater criteria and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

A. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at the Moses Lake Sand Dunes facility for analyses of internal samples; the Laboratory is accredited for the parameters listed in Table 11.

Table 6: Accredited Parameters

Parameter Name	Category	Method Name	Matrix Description
Specific Conductance	General Chemistry	SM 2510 B-2011	Non-potable water
Solids, Total Dissolved	General Chemistry	SM 2540 C-2011	Non-potable water
Solids, Total Suspended	General Chemistry	SM 2540 D-2011	Non-potable water
pH	General Chemistry	SM 4500-H+ B-2011	Non-potable water

Parameter Name	Category	Method Name	Matrix Description
Dissolved Oxygen	General Chemistry	SM 4500-O G-2011	Non-potable water
Phosphorus, Total	General Chemistry	SM 4500-P E-2011	Non-potable water
Biochemical Oxygen Demand (BOD)	General Chemistry	SM 5210 B-2011	Non-potable water
Carbonaceous BOD (CBOD)	General Chemistry	SM 5210 B-2011	Non-potable water
Fecal coliform-count	Microbiology	SM 9222 D (mFC)-06	Non-potable water

B. Wastewater monitoring

Ecology details the proposed monitoring schedule under Special Condition S2.A and S2.B. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's Permit Writer's Manual (Publication Number 92-09) for an extended aeration, activated sludge treatment plant and consistent with agency guidance given in the current version of Ecology's Implementation Guidance for the Ground Water Quality Standards for municipal wastewater land treatment systems.

Wastewater treatment performance will be evaluated using weekly effluent measurements of BOD₅, total coliform, and TKN; pH monitoring will remain at a continuous frequency.

The proposed permit removes monitoring in effluent of the parameters of: dissolved oxygen, temperature, calcium, sodium, potassium and magnesium because these constituents are not regulated under Ch 173-200 WAC. Calcium, magnesium, sodium and potassium have only been detected at low concentrations in groundwater.

The proposed permit also removes effluent monitoring for cadmium, chromium, lead, mercury, and silver because these constituents have not been detected in effluent or in groundwater.

Metals that will continue being monitored annually in effluent (and in groundwater) under the proposed permit are: arsenic, copper, iron, manganese and zinc.

Monitoring for ammonia and total nitrogen are deleted from the proposed permit. Neither ammonia nor total nitrogen are regulated in groundwater. Additionally, ammonia content is detected by the Total Kjeldahl Nitrogen (TKN) analysis; monitoring for both parameters is redundant.

Reporting of total nitrogen consists of adding the nitrate and the total Kjeldahl nitrogen content; because total nitrogen is not regulated, and the information on the constituents included in the total nitrogen calculation are already being reported, it is not necessary to add this calculated value in the list of reported parameters. Phosphorus reporting is added to the permit because phosphorus loading to the downgradient Moses Lake receiving water is contributing to harmful algal blooms in the Lake.

C. Sludge monitoring

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

D. Groundwater monitoring

Ecology requires groundwater monitoring at the site in accordance with the Ground Water Quality Standards, chapter 173-200 WAC. Ecology has determined that this discharge has a potential to pollute the groundwater.

Therefore, the Facility must evaluate the impacts on groundwater quality. Ecology considers monitoring of the groundwater at the site boundaries and within the site an integral component of such an evaluation.

Monitored parameters in groundwater that were included in the previous permit, and are being discontinued in the proposed permit are as follows: dissolved oxygen, temperature, calcium, magnesium, potassium, sodium and conductivity. These parameters will no longer be monitored because groundwater quality standards have not been established for them.

Metals that have not been detected in groundwater will be discontinued; those include cadmium, chromium, lead, mercury and silver. Lead and mercury have not been detected in groundwater since 2009. Lead is not monitored in effluent, and the absence of lead detections in groundwater provides the basis for eliminating lead monitoring in groundwater from the proposed permit. Mercury and silver have not been detected in effluent or groundwater, providing the basis for discontinuing monitoring for these parameters in the proposed permit. Cadmium was detected in one effluent sample above detection level concentrations, and has not been detected in groundwater.

Chromium has been detected in the upgradient monitoring well (MW-4), but not the two downgradient wells (MW-2 and MW-3). Chromium has not been detected in effluent, suggesting that effluent infiltration is diluting the chromium concentration, and improving groundwater quality. As a result, chromium monitoring in groundwater is removed from the proposed permit.

Metals that will continue being monitored annually in groundwater under the proposed permit are: arsenic, copper, iron, manganese and zinc.

The downgradient surface water body (Moses Lake) is impaired with respect to dissolved oxygen. Monitoring of phosphorus in groundwater is added to the permit in order to assess the potential for phosphorus in facility effluent to contribute nutrients that affect dissolved oxygen concentration in the Lake. Nitrate, total Kjeldahl nitrogen and total organic carbon monitoring will continue in order to assess nutrient in effluent loading to groundwater.

V. Other Permit Conditions

A. Reporting and recordkeeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-216-110).

B. Prevention of facility overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-216-110 require Moses Lake Larson WWTP to:

- Take the actions detailed in proposed permit Special Condition S4.
- Design and construct expansions or modifications before the treatment plant reaches existing capacity.
- Report and correct conditions that could result in new or increased discharges of pollutants.

Special Condition S4 restricts the amount of flow.

C. Operations and maintenance

Ecology requires dischargers to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state regulations (WAC 173-240-080 and WAC 173-216-110). The facility must prepare and submit OR has prepared and must submit an update of an operation and maintenance (O&M) manual for the wastewater facility.

Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit and ensures the facility provides AKART to the waste stream.

D. Pretreatment

Duty to enforce discharge prohibitions

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes “pass-through” or “interference”. This general prohibition is from 40 CFR §403.5(a). Appendix C of this fact sheet defines these terms.
- The second section reinforces a number of specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:
 - a. Are prohibited due to dangerous waste rules.
 - b. Are explosive or flammable.
 - c. Have too high or low of a pH (too corrosive, acidic or basic).
 - d. May cause a blockage such as grease, sand, rocks, or viscous materials.
 - e. Are hot enough to cause a problem.
 - f. Are of sufficient strength or volume to interfere with treatment.
 - g. Contain too much petroleum-based oils, mineral oil, or cutting fluid.
 - h. Create noxious or toxic gases at any point.

40 CFR Part 403 contains the regulatory basis for these prohibitions, with the exception of the pH provisions, which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology.

These discharges include:

- a. Cooling water in significant volumes.
- b. Stormwater and other direct inflow sources.
- c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

As sufficient data becomes available, Moses Lake must, in consultation with Ecology, reevaluate its local limits in order to prevent pass-through or interference. If any pollutant causes pass-through or interference, or exceeds established sludge standards, Moses Lake must establish new local limits or revise existing local limits as required by 40 CFR 403.5.

In addition, Ecology may require revision or establishment of local limits for any pollutant that causes a violation of water quality standards or established effluent limits, or that causes whole effluent toxicity.

Ecology may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern.

E. Solid wastes

To prevent water quality problems the facility is required in Special Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503 "Standards for Use of Disposal of Sewage Sludge", and by Ecology under chapter 70.95J RCW "Municipal Sewage Sludge – Biosolids", chapter 173-308 WAC "Biosolids Management," and chapter 173-350 WAC "Solid Waste Handling Standards." The disposal of other solid waste is under the jurisdiction of the Grant County Health Department.

Requirements for monitoring sewage sludge and record keeping are included in this permit. Ecology will use this information, required under 40 CFR 503, to develop or update local limits.

F. General conditions

Ecology bases the standardized general conditions on state law and regulations. They are included in all state waste discharge permits issued by Ecology.

VI. Permit Issuance Procedures

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for groundwaters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state regulations.

B. Proposed permit issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of five years.

VII. References for Text and Appendices

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Washington State Department of Ecology.

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[Laws and Regulations](#) (<https://ecology.wa.gov/About-us/How-we-operate/Laws-rules-rulemaking>)

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(https://ibis.geog.ubc.ca/courses/geob370/students/class06/vicsewage/References_files/municipal_land_treatment_design_criteria.pdf)

Appendix A - Public Involvement Information

Ecology proposes to reissue a permit to Larson WWTP. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology determined that the application did not have changes in the volume of the discharge or a change in characteristics of the discharge, nor were there significant changes since the current permit was issued, therefore Ecology is not required to public notice its intent to reissue the permit or solicit public review of the drafts; WAC 173-216-090.

To view electronic copies of the documents go to [PARIS](#), Ecology's Water Quality Permitting and Reporting Information System website located online at <https://apps.ecology.wa.gov/paris/DocumentSearch.aspx> or paper documents can be viewed and copied between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below.

For more information, call the Department of Ecology Eastern Regional Office at (509) 329-3400 or [visit Ecology's website](#) at www.ecy.wa.gov.

Ecology is an equal opportunity agency. If you need this publication in an alternate format, please call (509) 329-3400 or TTY (for the speech and hearing impaired) at 711 or 1-800-833-6388

The primary author of this permit and fact sheet is Llyn Doremus.

Appendix B - Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
<p>Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503</p> <p>Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501</p>	<p>Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608</p> <p>Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903</p>

Appendix C - Glossary

1-DMax or 1-day maximum temperature -- The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of 30 minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures -- The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute toxicity -- The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART -- The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance -- An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient water quality -- The existing environmental condition of the water in a receiving water body.

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow (AADF) -- average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit -- The average of the measured values obtained over a calendar month's time taking into account zero discharge days.

Average monthly discharge limit -- The average of the measured values obtained over a calendar month's time.

Background water quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best management practices (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD₅ is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Categorical pretreatment standards -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean water act (CWA) -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance inspection-without sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring -- Uninterrupted, unless otherwise noted in the permit.

Critical condition -- The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of receipt -- This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution factor (DF) -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal coliform bacteria -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial user -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major facility -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum daily discharge limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is the maximum discharge of a pollutant measured during a calendar day.

Maximum day design flow (MDDF) -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow (MMDF) -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow (MWDF) -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection level (MDL) -- See Detection Limit.

Minor facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National pollutant discharge elimination system (NPDES) -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow (PHDF) -- The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow (PIDF) -- The maximum anticipated instantaneous flow.

Point of compliance -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user (PSIU) -- A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes). Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to $(1, 2, \text{ or } 5) \times 10^n$, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sample Maximum -- No sample may exceed this value.

Significant industrial user (SIU) --

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process waste stream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership.

Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5, 3, or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD₅ -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD₅ test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD₅ test is sufficient to remove the particulate organic fraction.

State waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater -- That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria -- A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids -- That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load (TMDL) -- A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total suspended solids (TSS) -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D - Technical Calculations

Ecology used the Sanitas[®] statistical software (v.9.6) to determine the tolerance limit values for iron and TDS as per Ecology's groundwater guidance. The tolerance limit represents background (upgradient) groundwater quality.

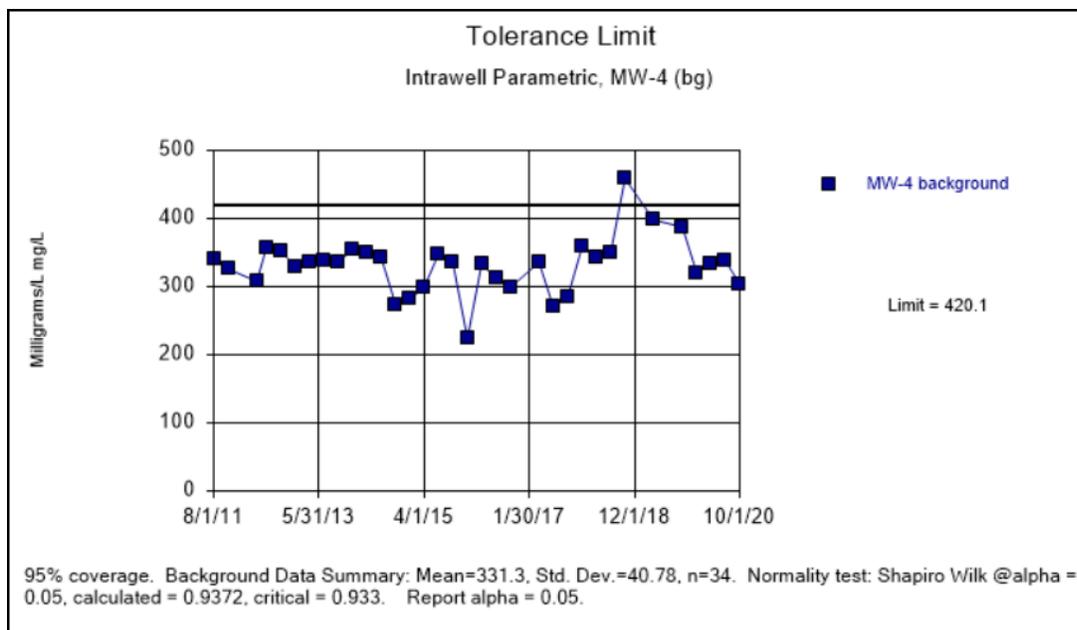
Ecology used the Unified Guidance Standards and configured Sanitas:

1. Tolerance limit:
 - a. User-specified alpha = 0.05
 - b. Test for Normality using Shapiro-Wilk/Francia, alpha based on n
 - i. Use ladder of powers
 - c. Default settings for all other functions.
2. Outlier values were removed from the data set.
3. Values were deseasonalized if seasonality was found
4. Sen's slope: If the software found a significant trend, Ecology progressively removed values from the data set, beginning with the earliest values, until no significant trend was found.

MW-4 background total dissolved solids

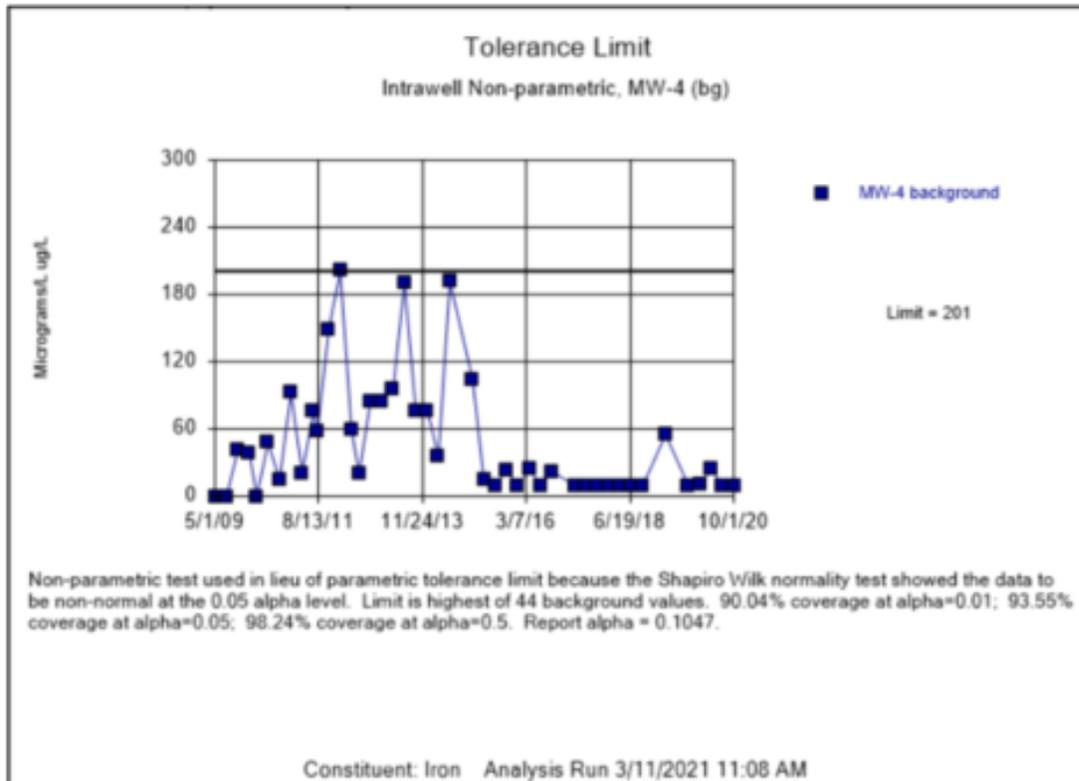
1. Outliers: 1 background value was removed (2/1/2012)
2. Normality: yes, only for cubed values
3. Seasonality: none
4. Sen's slope: raw data showed no trends
5. Tolerance limit = 420 mg/L

Total Dissolved Solids background calculation (using MW-4 upgradient well)



MW-4 background total iron concentration

1. Outliers: 2 background values were removed (7/1/2013; and 10/1/2014)
2. Normality: not present, so the highest value was used
3. Seasonality: none
4. Sen's slope: raw data showed no trends
5. Tolerance limit = 0.20 mg/L



Appendix E - Response to Comments

Ecology received comments from the City of Moses Lake in a letter dated October 15, 2021. The letter included 2 comments: 1) requested an increase in the TDS effluent limit from 500 mg/L to 600 mg/L, and 2) add an effluent limit for Total Coliform of 50 CFU/100 mL. Ecology's responses are as follows.

- 1) Ecology reduced the TDS effluent limit from 1,000 mg/L in the previous permit to 500 mg/L in the draft permit. The 1,000 mg/L is higher than the groundwater quality standard of 500 mg/L based on an Overriding Public Interest (OPI) determination made in 1989. Ecology's rules require reevaluation of OPI decisions every five years. This permit reconsidered the OPI determination, and proposed a reduction (more stringent) TDS level of 500 mg/L. The City requested to allow additional time to meet the more stringent limit by meeting an interim limit of 600 mg/L, while showing progress toward meeting the more stringent 500 mg/L standard by the end of the 5 year permit period. The proposed 500 mg/L TDS limit is modified to 600 mg/L.
- 2) Total Coliform limit of 50 cfu/100 mL was described in the Fact Sheet, and inadvertently left out of the draft permit limits. The final permit adds an effluent total coliform limit of 50 cfu/100 mL.